time in regard to the practicability or desirability of omitting from and adding to the list of useful drugs.

In this connection it should be remembered that the members of the council fully realize that individually or as a body they are neither omniscient nor infallible. From its very origin the council has sought the cooperation and assistance of not only medical men but also pharmacists.

In the revision of the list under discussion it is particularly important that pharmacists should be given an opportunity to record their criticisms and opinions of the list and its objects and to suggest ways and means for inducing pharmacists generally to prepare and to dispense the preparations included in the list in accord with official requirements.

As has been pointed out before, we in this country are sadly in need of more energetic and more effective control of all drugs and medicines. The only really safe and efficient control involves honesty, knowledge, intelligence, and care on the part of the person dispensing the medicine to the consumer, so that pharmacists as a class must be induced to devote special attention to the systematic examination and control of drugs and preparations widely used in the treatment of disease. In conclusion it may be stated that pharmacists as a class may well endeavor to secure for themselves and for their craft the recognition and respect that are properly their due for services rendered, but it will be practically impossible to do this unless they collectively and individually insist that all members of their craft live up fully to the requirements that may be reasonably made of them.

PUBLIC HEALTH ADMINISTRATION IN CHICAGO, ILL.

A STUDY OF THE ORGANIZATION AND ADMINISTRATION OF THE CITY HEALTH DEPARTMENT.

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BUREAU OF FOOD INSPECTION.

The bureau is under the supervision of a chief and assistant bureau chief. The office force consists of a chief clerk, seven junior clerks, and one stenographer. A veterinarian, charged with the supervision of inspected farms, divides his time between field and office work. The bureau chief, assistant chief, and veterinarian each have the services of a stenographer. The field force comprises inspectors and supervising inspectors.

Laws and ordinances.—The provisions of the ordinances under which the bureau of food inspection operates are briefly summarized as follows:

Every person or corporation selling milk must secure a license, and this applies to every store, booth, and wagon. Vehicles must carry the name and address of place of business on the outside, together with a metal plate showing the words "Chicago" and "Milk" and the number of the license.

All milk, cream, or condensed milk shipped into Chicago must be in cans sealed with the metal seal of the shipper, and no one can sell or dispose of milk shipped in any other way.

Bottled milk must show on the cap the name of the person or corporation that bottled it. Milk sold in stores selling other merchandise must be in tightly closed and capped bottles or some receptacle approved by the commissioner of health.

The cans or bottles must be washed immediately after emptying and sterilized before being refilled. Refrigerators or other places where milk is stored or handled must be kept clean and free from articles that might contaminate the milk.

One ordinance provides that all milk not falling into the class of inspected milk must be pasteurized. To be classed as "inspected" milk must be produced on farms scoring not less than 70 per cent and not contain more than 100,000 bacteria per c. c. from October 1 to May 1, nor more than 150,000 bacteria from May 2 to September 30. Inspected cream may not contain more than 150,000 bacteria per c. c. from October 1 to May 1, nor more than 300,000 bacteria from May 2 to September 30.

Cleanliness in milking must be observed, and the pails, etc., sterilized before use. Milk must immediately be removed from the stable, strained, and cooled to 55° F. or below.

"Inspected milk" must be so labeled, and the cap must, in addition to the name of the bottler, also show the day of the week upon which the milk was bottled. Inspected milk must come from herds inspected and passed by the veterinarian of the department of health or the United States Government.

Milk not conforming to this standard must be pasteurized and come from farms inspected by the department of health. The standard set for pasteurized milk is a bacterial count of 50,000 per c. c. from October 1 to May 1 and 150,000 from May 2 to September 30.

In all continuous pasteurizers the milk and cream must be heated to a temperature to kill 99 per cent of the bacteria and all pathogenic bacteria in the raw product. The temperature must be not less than 140° F. for 20 minutes or not less than 155° F. for 5 minutes.

Pasteurized milk must be so labeled, with the date.

The milk standard requires that milk shall contain not less than 12 per cent total solids, nor less than 3 per cent butter fat, nor more than 88 per cent watery fluid. The standard for cream is fixed at not less than 15 per cent butter fat. Persons offering milk below standard for sale are subject to a fine.

Skimmed milk must be shipped in cans painted red and labeled "Skimmed milk."

Milk and cream transported into the city or delivered from point to point must not be at a temperature higher than 55° F.

Milk can not be sent from dairies or sold from milk depots and stores where a communicable disease exists in an employee or in his family.

Adulteration and addition of coloring or preservative agents are forbidden.

Cows must not be fed on slops or refuse of breweries and vinegar factories; nor may milk be sold from cows 15 days before to one week after parturition.

Ordinances provide for the regulation and supervision of ice manufacture, and prohibit the sale of ice from certain sources; provisions are made for licensing establishments and inspecting sources and plants where ice is stored or manufactured.

Persons engaged in manufacturing or bottling waters, carbonated waters, sirups, or flavoring extracts must have a license. The floors of the establishments must be of proper material and the premises must be kept clean. No such plant can be established in a room where any other business interfering with the sanitary conditions is carried on, or in a room connecting with any stable.

Rooms of bottling plants must be properly ventilated and lighted. Between May 1 and November 1 all windows must be provided with fly and dust screens and all doors with self-closing screen doors.

Persons suffering from consumption, venereal disease, or communicable skin disease may not work in such plants, nor may persons suffering with or convalescent from typhoid, diphtheria, smallpox, chicken-pox, or scarlet fever. Persons living in houses where these diseases prevail are also prohibited until the quarantine is over and disinfection complete.

Licenses must be secured for meat markets, delicatessen stores, restaurants, slaughterhouses, and rendering and packing establishments. Provisions are made for methods of slaughtering, inspection of cattle, game, fish, poultry and meat, time and places where the salughtering can be done, and a sanitary inspection and control.

Horse flesh for human consumption is prohibited.

Ordinances provide for the packing and handling of fruits, berries, and vegetables, and for the inspection and condemnation of decayed or unwholesome vegetables and fruits.

An ordinance exists providing for the regulation of cold-storage warehouses and the keeping of foodstuffs in cold storage.

Provisions also exist for the inspection of places where malt liquors are bottled and the general sanitary control of such establishments.

Ordinances also provide regulations governing the manufacture of bread, the location and construction of bakeries, and the proper protection of breadstuffs from contamination.

Milk Inspection.

On account of the absence of specific ordinances, proper supervision over dairies, milk depots, and pasteurizing plants was handicapped until 1912; and because of insufficient appropriations active inspection of dairies was impossible until July, 1913.

In considering milk inspection, the following subdivisions naturally suggest themselves: (*a*) dairies; and (*b*) city milk inspection.

COUNTRY DAIRY INSPECTION.

Chicago's daily milk and cream supply of 353,000 gallons is supplied by 14,000 dairies located in Illinois, Wisconsin, Indiana, and Michigan. It is delivered to 81 distributing platforms over four electric interurban railroads and 19 steam railroads. It is estimated that 500,000 cows are maintained for dairy purposes, of which approximately 300,000 are milking. Farms in Illinois and Wisconsin supply the bulk of the milk, with Indiana third and Michigan fourth. Shipments of cream are occasionally received from Ohio and Iowa when there is a shortage in Chicago's regular supply.

The average haul of the milk is 45 miles, and the extreme distance is 130 miles. Eighty per cent of the milk is received from the territory within a radius of 60 miles of Chicago. Many dairies are located only a few miles from the city.

There are 7 small dairies in the suburbs of the city, milking about 200 cows, but as some families keep 1 or 2 cows, there are about 800 of these animals in Chicago. A person must secure a permit to keep a cow in the corporate limits of the city.

This territory is divided into 15 dairy districts, averaging about 933 farms each. To each district is assigned one inspector, whose duty is to inspect and score the farms, creameries, and pasteurizing plants that supply their products to Chicago. The score card of the United States Department of Agriculture is used in estimating and recording the condition of equipment and methods of handling the products.

The inspection of dairies was amplified in 1914. The territory was then mapped out into definite districts and each inspector held responsible for the inspection of all the dairies in his district. He was also instructed to furnish reliable information of the exact location of each dairy, using a spot map for this purpose, so that the exact number of dairies and their location would be known for the entire field. This has been accomplished and a spot map of the entire dairy field is now in course of preparation.

Taking into consideration that there is an average of 933 farms in a district, and estimating that the inspection of 40 farms per week is a proper standard of work, it will be readily seen that the dairy farm inspection service is inadequate. On this basis a dairy would be inspected only twice a year, and the interval between inspections is too long for satisfactory supervision. Bearing in mind that the quality of milk depends largely upon the manner in which it is produced, and that, to a considerable extent, this depends upon instructing the dairyman in cleanly methods in milking and handling the milk products of his dairy, it is apparent that the employment of additional inspectors in this work is needed.

A study was made of the time elapsing between inspections and reinspections of 200 dairy farms during the last two years. Of this number, 60 farms had not been reinspected, the remaining 140 farms being reinspected within an average time of 6.61 months.

TABLE 1.—*Time elapsing between inspections in 200 dairy farms, 1914.*

Number of months elapsing.	Number of dairy farms.	Number of months elapsing.	Number of dairy farms.
1	1	12	7
2	9	13	1
3	25	14	1
4	22	15	2
5	19	16	2
6	8	17	1
7	5	21	1
8	8	26	1
9	12	Not reinspected	60
10	6		
11	9	Total	200

On many farms where orders had been given for improving general conditions and for changes in handling milk no reinspection had been made in months to see if the remedial measures had been carried out. Furthermore, in cases where farm conditions warranted shut-off, dairymen were permitted to continue shipping their products into the city provided they made affidavits that they would at once comply with the requirements. This plan would probably be effective if prompt reinspection was made to see if the changes had been carried out, but with the small number of inspectors that does not seem to have been possible. Unfortunately, the dairyman knows from past experience that reinspections are infrequent and generally does not make the prescribed changes until he thinks the inspector is due back.

Dairy inspection to be effective must be sufficiently frequent to insure proper supervision and especially to enable the inspector to promptly follow up those farms in which changes have been required. There should be ample time to make a careful inspection and to instruct the dairyman in advantageous changes in his stables, milk house, proper cleanliness in milking, cooling of milk, and improved methods in handling the dairy products. A properly qualified inspector can often accomplish more in a half hour's intelligent talk with a dairyman than by a half dozen cursory inspections of the premises. He will soon learn that there are a number of dairies in his district that are clean and properly managed, requiring inspection at only long intervals, whereas others will require frequent inspection to raise them to the proper standard. The average dairy farm should be inspected at least three times a year; some will require inspection every two or three months, whereas those in which changes have been required, or are in bad sanitary condition, should be reinspected at the expiration of the time allowed for such changes. I believe that in order properly and satisfactorily to cover the large number of dairies, the number of inspectors for field dairy work should be increased by 10, one of whom should be a supervisor, making a total of 25.

However, in this connection the advisability of the State executing an inspection service of all dairies in the State of Illinois should be considered. The inspection of dairies by the city department protects only Chicago, whereas that by the State would be operative for all cities in the State. If a scheme of cooperation satisfactory to both departments could be effected, and the work was taken over as outlined above, there would be no need of an increase in the number of inspectors, with the exception of one supervisor for dairy work. It would seem desirable that this consolidation should be made for the inspection of the dairies, but the inspection of the pasteuriz-

ing plants located in the country which supply milk and its products to Chicago should be under the inspection service of that city.

Two grades of farms are recognized by ordinance: Those supplying inspected milk, which shall score 70, and all other dairy farms shipping products to pasteurizing plants that shall score 55. But although a steady improvement has taken place not only in the general sanitary conditions of the farms, but in the quality of the milk as well, many of the farms are below the grades prescribed by ordinance.

The scores of 500 farms reported from 1910 to 1914 were tabulated, and a study of this table shows marked variation between the lowest and highest. The average scores show a rise from 51.18 in 1910 to 56.41 in 1914.

The standard for inspected milk is high and much of the milk furnished does not conform. The real object was to force pasteurization; 18 per cent of the milk consumed in the city falls in this class. The scores of 500 farms supplying this grade are shown in Table 3.

TABLE 2.—*Scores of 500 dairy farms for years 1910–1914.*

Year.	20 to 30 per cent.	31 to 35 per cent.	36 to 40 per cent.	41 to 45 per cent.	46 to 50 per cent.	51 to 55 per cent.	56 to 60 per cent.	61 to 65 per cent.
1910	1	4	18	58	97	103	125	70
1911	1	3	24	51	89	110	111	86
1912	.....	3	25	42	51	103	120	105
1913	.....	.....	11	14	40	66	139	124
1914	.....	.....	7	7	38	89	115	139

Year.	66 to 70 per cent.	71 to 75 per cent.	76 to 80 per cent.	81 to 85 per cent.	Scores.		Average score, per cent.
					Minimum.	Maximum.	
1910	22	2	.....	.....	29	75	51.18
1911	25	7	1	1	20	83	53.85
1912	36	10	4	.....	33	79	55.56
1913	62	8	5	.....	.....	.....	55.00
1914	74	20	2	.....	.....	.....	56.41

TABLE 3.—*Scores of 500 dairy farms supplying inspected milk for year 1914.*

Score.	Number.	Score.	Number.
31 to 40 per cent	3	81 to 90 per cent	1
41 to 50 per cent	44		
51 to 60 per cent	155	Total	500
61 to 70 per cent	271		
71 to 80 per cent	26	Average score, per cent	62.84

An ordinance requires that reports of herds furnishing inspected milk shall be filed with the department every six months, the certificate showing that the cows have been inspected by a duly authorized veterinarian and found free from tuberculosis. The veterinarian of the bureau staff is charged with the supervision of herd inspection

and general dairy control. He instructs the dairymen as to the necessary changes to be made in order that their dairies may be released.

A study of dairy farm scores shows that there should be more uniformity of standard in scoring, and that inspectors vary much in their methods. Further instructions and practical demonstration in the field should be given the inspectors.

A supervising inspector should be provided who may devote all his time to this field work in connection with dairy farms. At present one supervisor not only has this work, but also that of milk platforms, milk depots, and pasteurizing plants in the city.

The milk at the dairy is not effectively cooled during the summer months. As few dairymen use ice, but rely on well water to take its place, the result is that the night milk is generally cooled, but the morning milk is not, as immediately after milking the cans must go to the railroad platforms for shipment to the city.

Transportation.—The transportation of milk by trains to the city during the summer months is faulty in that proper refrigeration of cars is not provided, although an ordinance specifically provides that milk for use in Chicago must be kept at 55° F. or lower. A study shows that there is an increase of two or three degrees in the temperature of the milk in short hauls, even on cool days, with a greater increase in very hot weather.

So far the department has been unable to enforce refrigeration of milk trains. Ten test suits against the carriers have been instituted for violation of the ordinance. This question may be settled at an early date. If the present ordinance is found ineffective, another should be enacted to enforce the provisions.

One fact is certainly established, that much of the milk received at the platforms during the summer months is at a temperature far in excess of that allowed by ordinance. The dairymen maintain that the milk is at the proper temperature when it leaves the farms (which is probably not correct for the morning milk) and that the increase in temperature occurs during transit on the railroads.

CITY MILK INSPECTION.

The inspection of milk in the city is carried out at the following places: (*a*) Milk platforms; (*b*) milk depots and stores; and (*c*) pasteurizing plants.

Milk platform inspection.—The larger amount of milk is shipped in 8-gallon cans and is received at the platforms between 9 and 10.30 a. m. There are 81 platforms, and the daily shipments vary from 100 to 600 cans at each platform. The inspectors meet the milk trains and do such inspection as their time will permit; but all they can do is to see that the cans are sealed, inspect general cleanliness of cans to be returned, and watch for milk that has been excluded.

With the number of platforms and the amount of milk received it is impossible, in the opinion of the writer, for five inspectors, the number assigned to platform work, to carry out adequate inspection.

In the summer, temperature tests of milk are made and in the winter an occasional sediment test is made. Only a few samples for chemical or bacteriological examination are taken at the platform. If provisions were made for an increase in the number of inspectors, so that a more adequate inspection service could be carried out, a larger number of milk samples should be taken at this point. Thus a more direct check would be had on the milk of farms from which improvement had been required.

In order to execute satisfactory platform inspection and the taking of a requisite number of milk samples for examination, it will be necessary to increase the number of such inspectors to eight. The writer witnessed the inspection at some of the platforms and it was inadequate.

Milk depot inspection.—The city is divided into 14 milk districts, to each of which is assigned an inspector, who devotes all his time to the inspection of milk depots, milk wagons, and pasteurizing plants. He inspects and scores the general sanitary conditions of the premises and the equipment and methods of handling milk and milk products.

There are 1,050 milk depots and 246 pasteurizing plants in the city of Chicago. A milk depot is a place where only milk and milk products are sold, and a separate room must be used exclusively for the purpose. I inspected a considerable number of such places in different sections of the city, and the most striking feature noticed in this industry is the very large number of small depots operated by foreigners who sell only a few cans daily. It seems that these foreigners are prone to engage in selling milk as soon as enough money has been saved to enable them to start on a three to five can basis. Many of these operators have to be trained to habits of cleanliness, and until trained their milk rooms and equipment are not in the sanitary condition necessary for handling milk. In some districts at least 30 per cent of the depots should be closed, and not more than 50 per cent meet the minimum of sanitary requirements. Of course, in other districts conditions are better, but on the whole there is need for much improvement, and it will be in the interest of an improved milk supply when many of the small depots are forced out of business by the competition of larger and more sanitary depots. About 50 milk depots supply more than 50 per cent of the total amount of milk consumed.

Some difficulty has been encountered by the department in closing insanitary milk depots, but a number have succumbed to the persistent requirements for improved conditions and methods of handling.

The inspectors cover their district about once a month, although some depots are inspected at more frequent intervals. The minimum work standard for an inspector is 30 original inspections and scorings per week, and the collection of at least 65 chemical milk and cream samples and 7 bacteriological samples per week.

Where chemical analysis of milk and cream samples shows noncompliance with the requirements, the milk dealer is notified to that effect, and in the case of repeated offenses, suit is brought. The same procedure is followed in case of bacteriological examination, except that no suits have been brought on account of high bacterial count alone.

In 1913, 42,503 chemical analyses and 7,131 bacteriological examinations of milk and cream were made, and the number of milk and cream examinations in Chicago during 1914 were as follows:

Chemical	50,397
Bacteriological	9,114

Tables 4 and 5 show the number of milk and cream samples examined chemically and bacteriologically per 1,000 population in 21 cities:

TABLE 4.—*Number of bacteriological examinations of milk and cream per 1,000 population per annum.*

1. Cincinnati	45.03	11. Winnepeg	5.00
2. Buffalo	15.86	12. New York	4.97
3. Baltimore	15.37	13. Rochester	4.40
4. Detroit	14.63	14. Cleveland	3.85
5. Toronto	13.26	15. Washington	3.47
6. Richmond	12.01	16. Chicago	2.85
7. San Francisco	10.53	17. Newark	2.76
8. Portland	9.58	18. Montreal	2.52
9. Boston	9.13	19. Milwaukee	2.50
10. Seattle	8.75	20. Kansas City	2.04

TABLE 5.—*Number of chemical analyses of milk and cream per 1,000 population per annum.*

1. Cincinnati	[1]43.96	12. St. Louis	11.74
2. Buffalo	39.24	13. Buffalo	11.63
3. Cleveland	38.46	14. San Francisco	10.53
4. Milwaukee	32.50	15. Portland	9.58
5. Washington	25.46	16. Seattle	8.75
6. Richmond	19.20	17. Rochester	8.00
7. Detroit	18.53	18. Newark	3.67
8. Boston	17.70	19. Montreal	3.02
9. Chicago	17.00	20. New York	1.84
10. Toronto	15.92	21. Winnepeg	.50
11. Kansas City	13.60		

[1]Based on figures for six months.

An examination of the tables shows that the number of bacteriological examinations made of milk and cream in Chicago is low in comparison with many other large cities. The number of these examinations should be increased.

During the summer months 50 per cent, and in the winter 25 per cent, of the chemical samples are required to be taken from milk wagons. This inspection work is done from 3 to 11 a. m.

Each milk depot is scored on the following basis: Location, construction, equipment, and general sanitary condition of the plant, and methods of handling milk products. A minimum score of 70 is required.

The system of scoring by different inspectors, however, is not uniform, and some depots are given scores not justified by actual conditions. There is need for instruction and practical demonstration by supervisors in the field, who should point out to the inspectors the proper standards to be used.

A study of the scores of 500 milk depots during the years 1912, 1913, and 1914 shows average scores of 77, 76.66, and 77.98, respectively. Though these changes are relatively small, the standard of conditions of the entire number of depots shows an appreciable rise.

Milk stores.—Although the inspection of milk stores falls under sanitary food inspection and is conducted by the inspectors of that subdivision, the writer deems it best to give them brief consideration in this place.

Milk stores are mostly grocery stores, which also sell milk. Although the ordinance requires that only bottled milk shall be sold, about 2 per cent of the amount of milk sold is handled in bulk; in the latter instance a separate room is required, but in the majority of cases this requirement is not met. A refrigerator must be provided and a separate compartment used for milk exclusively. There are about 5,000 such stores. An inspection was made of several, including some selling milk in bulk. The general sanitary condition noted on the premises does not warrant selling milk except in bottles, and all selling in bulk in these stores should be stopped.

Tables 6 and 7 give the scores of 500 milk depots and stores for the years 1912, 1913, and 1914. I think the average scores are too high and those I inspected certainly were not entitled to such a rating.

TABLE 6.—*Scores of 500 milk depots for years 1912–1914.*

Year.	Under 30 per cent.	31 to 40 per cent.	41 to 50 per cent.	51 to 60 per cent.	61 to 70 per cent.	71 to 80 per cent.	81 to 90 per cent.	91 to 100 per cent.	Total.	Average score (per cent).
1912	1	1	8	23	60	206	177	24	500	77.00
1913	.....	.....	3	10	66	280	125	16	500	76.66
1914	.....	.....	2	3	35	302	138	20	500	77.98

TABLE 7.—*Scores of 500 milk stores for years 1912–1914.*

Year.	Under 30 per cent.	31 to 40 per cent.	41 to 50 per cent.	51 to 60 per cent.	61 to 70 per cent.	71 to 80 per cent.	81 to 90 per cent.	91 to 100 per cent.	Total.	Average score (per cent).
1912	.....	.....	1	9	22	52	117	299	500	88.95
1913	1	4	4	5	16	56	98	316	500	88.75
1914	.....	.....	2	2	14	57	113	312	500	89.76

Pasteurizing plants.—Eighty-two per cent of the milk and cream consumed in Chicago is pasteurized in 246 pasteurizing plants in the city and 115 in the country. Since the outbreak of foot-and-mouth disease in Illinois, Wisconsin, and other States the pasteurization of all milk from farms within a radius of 5 miles of an infected center is required, and careful watch has been kept over the plants to insure an effective process.

Pasteurization is now required by the holding method and there are several types of apparatus in use operating on this principle. Formerly there were quite a number of flash-type in operation, but all these were required to install holding apparatus in order to secure a license to operate after January, 1915. The required process is not less than 140° F. for 20 minutes, or 155° for 5 minutes, counting from the time this temperature is reached.

Frequent inspections are made of pasteurizing plants while in operation, and the temperature of the milk in different stages of the process and the length of time held are carefully studied, with the feeding apparatus adjusted so that the milk is properly pasteurized. Examination is made as to technique and cleanliness of equipment and insanitary conditions or improper handling of the milk are corrected. By taking samples for bacteriological examination at different stages of the process, the efficiency of the pasteurizer is determined. Before a license is granted to new plants, three specially trained inspectors examine and regulate them. Automatic temperature recording devices must be attached to each pasteurizer.

A special card is used for scoring pasteurizing plants, which takes into consideration three important factors: Location and construction of room, including light, ventilation, floors and walls, where pasteurizing apparatus is installed; the equipment, integral parts of the plant itself, and the methods of handling. The last is given as much weight as the other two combined. This, in my opinion, is correct and should constitute the critical score as to whether a plant conforms to requirements or not.

There are several large pasteurizing plants in the city, well constructed and equipped, yielding good results; there are also many more small plants that are poorly constructed and equipped, and badly managed, yielding poor results. Several of the small plants

have been forced to close by the requirement of holding apparatus, and no doubt many more will succumb to the competition of the larger and more economically conducted plants.

Much that was said regarding the small depots can be applied to these small pasteurizing plants, and the sooner they are forced out of business the better it will be for Chicago's milk supply.

Certified milk.—By ordinance this grade of milk falls into the class of inspected milk, but is of a higher grade than the bulk of raw milk on the market. It is secured from farms under regulations as to hygiene prescribed by the milk commission of the Chicago Medical Society. About 12 farms are producing milk which is sold under the name of "Certified milk."

Improvement in milk.—The health department has compiled a table showing the average bacteriological count of raw and pasteurized milk examined from 1910 to 1914, inclusive. The ordinance enacted August, 1912, requires that the bacterial count in raw milk shall not exceed 100,000 per c. c. during winter and 150,000 per c. c. during summer, and that in pasteurized milk the count shall not be greater than 50,000 and 100,000 for the respective periods.

TABLE 8.—*Average bacterial counts per c. c.—Samples taken at all seasons.*

Year.	Raw milk.	Market pasteurized milk.	Year.	Raw milk.	Market pasteurized milk.
1910	11,500,000	2,000,000	1913	2,000,000	500,000
1911	5,000,000	2,000,000	1914	1,000,000	100,000
1912	1,500,000	500,000			

A study of the above figures shows a steady improvement. The standard for raw milk, as already stated, is very high. At the time the ordinance was drafted with the object of practically requiring the pasteurization of all milk much opposition was encountered, and the standard for raw or inspected milk was made so high that no question of purity could be raised if the standard was reached. A percentage of the farms, however, do meet the requirements.

A very noticeable improvement has been effected in pasteurized milk, and no doubt the standard will be reached when most of the small plants have ceased to exist. The supervisor should be able to devote all of his time to the supervision of milk inspection and the work of the inspectors.

Sanitary Food Inspection.

There are 23 sanitary food inspection districts, to each of which a food inspector is assigned, and, in addition, 5 extra districts, centrally located, which are inspected in the afternoons by the same inspectors who inspect the milk at platforms in the morning.

The duty of these employees is to inspect all foodstuffs and the establishments in which they are sold, handled, manufactured, or stored.

An exception exists in the case of those bakeries in which structural changes have not been made in accordance with requirements and new bakeries until the commencement of operations. This supervision is vested in the bureau of sanitation.

A minimum of 65 original inspections per week in the regular districts and 20 per week in the extra districts is required of each inspector. This schedule has not only been met but exceeded, so that a greater number of inspections seems possible.

For the purpose of considering the work of this division, the following subdivision seems advisable:

(*a*) Slaughterhouses and inspection of meat therein.
(*b*) Express platforms inspection.
(*c*) Commission markets.
(*d*) Freight yard inspection.
(*e*) Sanitary food inspection.
(*f*) Restaurants.
(*g*) Miscellaneous inspection—eggs, canned goods, etc.

Slaughterhouses.—All cattle, sheep, and hogs are inspected before slaughter by a United States inspector and a State inspector. No diseased or overheated cattle are allowed to be slaughtered. Cattle infected with actinomycosis are separated from others, sent to one place, and are allowed to be slaughtered under special regulations.

Most of the meat consumed in Chicago is slaughtered at the large houses connected with the stockyards where United States Government inspectors are on duty. In such slaughterhouses the city does not maintain an inspection service, but accepts that of the Government inspectors. There are in the city five other slaughterhouses that supply meat to Chicago, and in them inspectors of the health department are on duty. Two inspectors are assigned to each slaughterhouse, so that one is always on duty during slaughtering. The carcasses are examined, and any diseased meat found is condemned and so tagged, and an inspector follows up the meat on the afternoon of the same day and determines that it has been properly disposed of in the rendering tanks.

All meat from the houses under Government inspection and other slaughterhouses is stamped, inspected, and passed, or condemned; and it is unlawful for any person to offer, expose for sale, or have in his possession any unstamped carcass.

A careful inspection was made of the five slaughterhouses mentioned above. Three of them were found in good condition, well constructed, equipped, and employing proper methods in handling the meat and waste products. One was old, with wooden floors, poorly equipped;

and insanitary; it should be condemned and closed. The fifth needs extensive improvements, especially in floor and ventilation of rendering room, as well as proper flooring in the killing pens. I also visited some of the larger slaughterhouses in the stockyards; these were found in good condition.

The meat inspectors on duty at slaughterhouses do not have control over the general sanitary conditions of the house, as this at present falls under the bureau of sanitary inspection. In my opinion this overlapping of duties serves no useful end, and as there is a food inspector always on duty in the slaughterhouses, he is in better position to look after the sanitary conditions therein and can easily cause the application of remedial measures.

Express platforms.—Animals slaughtered in the country, game, domestic fowls, fish, and some vegetables are unloaded at four receiving express platforms. Three inspectors are assigned for the inspection of these articles of food. They also have supervision over the cleanliness of the wagons, railway cars, and general sanitary condition of the platforms. As the wagons are generally awaiting the arrival of the train, this inspection, on account of lack of time, is often superficial when the shipments are large; but as these products are taken to the commission markets, the inspection is supplemented by one at the latter place, and thus all the products are examined. I visited more than 70 stores in the markets and found no carcass of meat that had not been stamped "Inspected and passed" or "Condemned." Many slaughtered hogs and calves are brought to the platforms, and most of the work consists in the inspection of the former for tuberculosis and the latter for immaturity.

I studied two of the largest platforms, and upon examining the method of shipment on the cars found that dressed hogs and carcasses of veal and beeves were thrown on the floor in the midst of coops of live fowls and boxes of fish without any protection whatever. The proper method would be to hang such carcasses on hooks, which could be done with little cost of equipment, and thereby transport such meats in a sanitary manner.

The platforms are provided with refrigeration rooms, in which meats not promptly removed are placed.

Freight yards.—There are 8 train tracks at the freight yards where 2 inspectors are assigned for the examination of vegetables and fruits. They also look after the proper disposal of such articles when condemned.

Commission markets.—It was surprising not to find any large general retail markets in Chicago. Meats, game, fish, poultry, fruits, and vegetables are handled in the wholesale commission markets, which supply the smaller butcher shops, grocery stores, and other retail places located throughout the city.

Three markets exist, two of which are very large, and the stores on both sides of the street for several blocks are devoted exclusively to the manufacture and sale of the food products mentioned above. Four food inspectors are assigned to these markets, and a very satisfactory inspection service is maintained.

I visited two of the large markets and inspected about 70 wholesale establishments, including sausage factories, process butter factory, and several other manufacturing plants. The meat-inspection service is thorough, carefully administered, and satisfactory. The meat supply is good and amply safeguarded by the health department. The inspectors are trained men and under the supervision of a very capable senior.

Butcher shops, groceries, poulterers, fishmongers, etc.—For the purpose of sanitary food inspection, the city is divided into 23 regular districts and 5 extra districts, and an inspector is assigned to each district to inspect food establishments, the condition of the food, methods of handling, and general sanitary condition of apparatus, refrigerators, storage, etc. Confectioneries, ice-cream parlors, ice-cream factories, and meat-food products establishments, as well as saloons, are embraced in this inspection work for the purpose of determining the cleanliness of glasses and the protection of food and methods used in serving lunches. Special attention is directed to the method of keeping bread, pastry, and candies. No specific ordinance requires that these products shall be properly protected from contamination by dust, flies, or handling, but an effort is being made to enforce such provisions under authority of a general ordinance.

The greatest problem in this connection is the proper protection of bread. An ordinance requires that it shall be transported in closed boxes, but any benefit accruing is minimized by the driver, who piles the bread in his arms in intimate contact with his soiled outer clothing and equally unclean hands. The only satisfactory manner in which to protect bread is to require by ordinance that it shall be wrapped at the bakery; at present only a small percentage of the bread is so protected.

Inspection of many butcher markets, groceries, and other food-product establishments showed them to be generally in good sanitary condition, although proper protection to bakery products and candies did not exist in several places visited. Screened windows and doors are used in butcher shops in summer to protect against flies.

Stores located in congested districts of the city are inspected once in five or six weeks, but those in outlying localities are not inspected so often.

Frequent inspection and supervision are necessary in the congested districts where the establishments are not in so satisfactory a sanitary condition. Education as to the necessity and importance of

cleanliness in the handling of food products is much needed in some of these districts, and inspectors should impress upon the proprietors the necessity for improvements in their methods.

Although all establishments should be inspected sufficiently often to insure proper supervision, those that are lax in their methods and in which sanitary conditions are not satisfactory should receive attention more often and proper reinspections should be carried out to bring the place up to requirements.

The function of the food bureau is to enforce ordinances regarding wholesomeness and sanitary handling of foodstuffs. There is no well-defined division of duties between the food bureau and the sanitory bureau as to enforcement of sanitary conditions in an establishment, and proper cooperation does not exist. A satisfactory arrangement would seem to be for the food inspectors to have jurisdiction over minor insanitary conditions about the premises, such as would have a direct bearing on the proper care of food products, and that major ones, such as nuisances from fault of construction, broken plumbing, etc., noted by the food inspector, be reported to the sanitary bureau for enforcement of proper remedial measures.

Restaurants.—Recently the jurisdiction of restaurants and lunch rooms has been transferred from the bureau of sanitary inspection to the food bureau. In the opinion of the writer this change was wise, as a more competent supervision is effected of the care and handling of foods served.

Bakeries.—These establishments were formerly under the bureau of sanitary inspection, and the food inspectors had supervision only over the finished products in the salesrooms. The procedure now in practice is for the bureau of sanitary inspection to have control of the construction and reconstruction of bakeries in accordance with ordinances governing such establishments, and, when completed and operation commences, for the food inspectors to have complete charge of the sanitary condition of the bakery and methods employed, as well as the manner of handling the finished products.

An examination of many bakeries, including the salesrooms, showed that there was no uniformity practiced in protecting bakery products from contamination by dust, flies, and handling. The majority had installed cases that protected from handling and dust, but not from flies, which is essential in the summer months. The fault seems to be due to absence of a specific ordinance on the subject.

Miscellaneous inspections.—Although the aim of the bureau is to generalize the inspection work under two grand divisions, milk and sanitary food inspection, there are a few instances of specialized inspection work. Two inspectors are assigned to the inspection of eggs; one to the inspection of canned goods; another has supervision

of plants manufacturing carbonated beverages; and one inspects ice plants and ice sources.

With the possible exception of the inspection of eggs and carbonated beverages, all this special work could be merged into the general sanitary food inspection.

As a whole, the work of the inspectors in the food bureau is commendable. They are intelligent and conversant with their duties and are doing efficient work. The number of supervising inspectors should be increased by providing one for dairy work, and the three now employed should devote all their time to field work.

Disposal of condemned food products.—Condemned meats are disposed of to a contractor whose bid has been accepted. No compensation is given the owner for condemned-food products. The office is notified by telephone of the amount, variety, and location of the food and the contractor is notified to remove it.

Meats are rendered for fats in making soaps. Milk is spilled, although in "shut-offs" the first lot is returned to the dairyman. Eggs are rendered for tanners' yolk; some in bad condition are removed with garbage. Vegetables and fruits are removed to an incinerator or the garbage scow by the owner. Canned goods are removed by the owner to garbage-loading stations for reduction. The inspector makes a written report showing the amount of different foods condemned, and a check is kept at the reduction plant to ascertain that such articles have been delivered.

Cold storage.—The existing ordinance governing the cold storage of food products was so difficult to enforce, requiring a large number of inspectors and an expenditure of money not commensurate with the benefits obtained, that a new ordinance has been drafted for enactment. The difficulty of inspecting all food products going into and coming out of cold storage was realized, and, furthermore, as a large proportion of goods in storage is not intended for local consumption, it was deemed most feasible thoroughly to inspect all such products at the point of final handling. This necessitates only a limited increase in the number of inspectors and meets all the conditions so far as the city of Chicago is concerned.

Office Methods.

The volume of work passing through the office is large and performed by a chief clerk, seven junior clerks, and one stenographer. It consists of preparing and mailing notices to those who violate ordinances governing food and requiring their compliance therewith, keeping records of reports of the food inspectors, and tabulating statistical work done.

The volume of work is indicated by the following table, No. 9:

TABLE 9.—*Notices issued during the year 1914 by months.*

	January.	February.	March.	April.	May.	June.
Complaints	114	49	12	14	19	66
Milk depots	132	104	100	181	269	227
Milk stores	299	320	617	556	434	477
Dairies supplying milk for pasteurization	1,103	701	853	1,077	1,838	1,841
Dairies supplying inspected milk	77	131	146	146	314	307
Pasteurizers	42	35	28	44	55	72
Markets and groceries	421	521	852	758	748	781
Ice	21	2	15	17	102	58
Carbonated beverages	4	8	19	22	79	11
Miscellaneous and saloons	251	222	404	249	206	244
Restaurants						
Total	2,464	2,093	3,046	3,064	4,034	4,084

	July.	August.	September.	October.	November.	December.	Total.
Complaints	78	51	53	40	48	38	582
Milk depots	230	183	130	109	69	43	1,768
Milk stores	728	728	682	767	248	29	5,885
Dairies supplying milk for pasteurization	1,648	1,553	1,490	1,239	284	1	13,628
Dairies supplying inspected milk	177	179	177	267	59	2	1,982
Pasteurizers	54	62	50	54	76	26	598
Markets and groceries	1,138	1,541	1,187	1,087	394	114	9,542
Ice	42	22	65	38	117	35	534
Carbonated beverages	12	3	9	10	2	4	183
Miscellaneous and saloons	309	293	379	431	96	28	3,112
Restaurants					1	172	173
Total	4,416	4,615	4,222	4,042	1,394	492	37,987

Files.—The large number of cards and records handled in this bureau makes filing one of the important steps in the office procedure. Files are kept as follows: Dairy farms, milk depots, pasteurizers and milk stores, stores handling miscellaneous foodstuffs, and pending action files.

Also separate compartments for the following: Suits, complaints, and "tickler file" for reinspection and miscellaneous.

The filing system seems adequate and if kept up to date furnishes the necessary information for the work of the bureau.

Suits.—When persons fail to comply with the ordinances governing food they are warned that immediate compliance is required; then, if they fail to carry out the prescribed remedial measures in the time granted for such work, a commissioner's letter is sent, and if reinspection shows that the violations have not been corrected suit is started under the authority conferred by law.

From January 1 to November 1, 1914, 1,313 suits for noncompliance with food ordinances were instituted. A study of the records of 500 suits brought by the bureau shows that the average time between starting and final disposition was 2 months and 18 days.

LABORATORY BUREAU.

The laboratory constitutes a bureau of the department of health, and the ordinances concerning its existence and administration provide:

For the establishment of a division in the department of health, known as health department laboratories.

For the appointment of a director and defining his qualifications. Outlining the duties of the director and the provisions for the appointment of his assistants.

That it shall be the duty of the director and his assistants to make analysis and examination of milk, cream, meat, foods, water, drugs, and such medical diagnosis and other examinations as may be directed by the commissioner of health.

In the study of the laboratory it became pertinent to ascertain the following: (1) If the space allotted for laboratory purposes is adequate and general arrangement satisfactory; (2) if equipment is ample and sufficiently up to date to be satisfactory; (3) functions; (4) the personnel and its efficiency in performing its work; (5) whether the technique in the different divisions is correct in principle and application; whether the work is expeditiously performed; if proper supervision is exercised over subordinates; and if proper records and files are kept.

Arrangement.

The space assigned in the city hall for laboratory purposes is sufficient, but such area should be devoted exclusively to laboratory work. The office of the assistant bureau chief of food inspection should be removed, as it should be in connection with the general offices of that bureau, and its location in the laboratory is not deemed advisable.

There is waste space in some of the rooms that could be used to advantage. In the room assigned to the division of chemistry, additional shelving for proper arrangement of bottles of reagents would be advantageous, and changes in the construction of certain cabinets would increase accessibility to apparatus. Changes to the hood in order more readily to carry off the fumes resulting from chemical examinations are also necessary.

The room for inoculated animals is satisfactory, if small, but that for stock animals is entirely unsatisfactory and primitive. A suitable animal room should be provided by dividing the space now used conjointly for this purpose and storage of property. This would provide not only a satisfactory animal room, but also one for safekeeping of property, both essential and badly needed.

Equipment.

The equipment, though not entirely up to date, is satisfactory for the general work carried out. Some additional apparatus is needed.

The garbage and waste from a laboratory are such that their destruction by burning is advisable, and a small crematory should be installed for this purpose. The present method of handling such garbage is not satisfactory.

Functions.

The work performed is that appertaining to board of health laboratories generally and embraces chemical analyses and bacteriological examinations of milk, cream, butter, other foods, and water; bacteriological diagnosis in certain communicable diseases; examination of beverages and pathological specimens; testing of fuels, oil, explosives, bureau supplies, and poisons; and any special investigations directed by the commissioner of health.

Four general classes of specimens are accepted for examination:

(1) Specimens collected by inspectors in the course of regular departmental work.

(2) Samples of supplies submitted by the chiefs of bureaus of the department of health.

(3) Samples or specimens submitted by the police or other city departments, subject to the approval of the commissioner of health.

(4) Specimens submitted by the public under the following classifications:

(*a*) For bacteriological diagnosis: (1) Specimens pertaining to communicable diseases: Diphtheria, tuberculosis, typhoid fever, cerebrospinal fever (cerebrospinal meningitis), malaria, syphilis, and rabies. (2) Other examinations for charity patients only.

(*b*) Specimens of drinking water, city water, including water supplied within a radius of 5 miles outside city limits, and wells within the city.

(*c*) Samples of milk and cream suspected of adulteration or addition of preservatives; also milk for bacteriological examination.

(*d*) General chemical analysis; all specimens in cases where the public health is involved.

Personnel.

A study of the personnel of the laboratory shows that the number of employees in the higher grades is sufficient for the present amount of work. The salaries of skilled employees who must possess technical knowledge, however, are small, and as the increase after a year's service from promotion to the next higher grade is slight, the emoluments of the position do not seem sufficient to retain the better trained assistants. Four of the higher positions are filled at the present time by temporary employees and some vacancies exist. A revised schedule of salaries was recommended for 1915.

One year's satisfactory service is a requisite for promotion to the next higher salary in the specific grades.

There are at present too few laboratory assistants, and two of the junior bacteriologists are engaged in work that could be as efficiently performed by lower-salaried employees. The efficiency of the staff would be increased if these bacteriologists could devote their time to the technical work.

Technique, System, and Methods.

There are two general divisions in the laboratory, chemistry and bacteriology. These are further subdivided for administration and efficiency into—

(1) General chemical, in which examinations are made of food, liquors, drugs, wines, poisons, fuels, oils, air, explosives, supplies, abortifacients, and garbage.

(2) Milk, chemical and bacteriological.

(3) Water, chemical and bacteriological.

(4) General bacteriological diagnosis: Diphtheria, typhoid fever, sputum, blood, urine, feces, and cerebrospinal fever (cerebrospinal meningitis).

(5) Special—Wasserman, pathological specimens, rabies, and special investigations.

Receiving samples and specimens.—A daily report of the receipt of samples or specimens is made on proper blank form designed for the purpose. The receiving clerk makes a record on this report upon receipt of all samples and specimens, with the exception of those of milk, sputum, typhoid fever, and diphtheria.

Samples of milk for bacteriological examination are noted on this form each day by the bacteriologist. Entries of the total number of typhoid fever, sputum, diphtheria, and other specimens of similar nature are made on the report the following morning from lists prepared by the stenographer. There is a column on this card for recording the time of completion of the examination or analysis, and this affords the director control information.

Each sample or specimen is accompanied through the laboratory by a card. Special cards are provided for diphtheria, typhoid fever, sputum, rabies, water, and milk (bacteriological). Two other cards are used for all other classes of samples or specimens, one for bacteriological cultures other than mentioned above, and the other for miscellaneous chemical samples.

The necessary data on the cards accompanying diphtheria and typhoid-fever specimens or cultures are given by the physician submitting them. On the other cards the receiving clerk records the necessary data by filling in the blank spaces of the respective cards, so as to insure identification and proper report on the specific sample, specimen, or culture. The date of receipt is stamped on the card, and when distributed to the proper division the employee receiving it initials the card as evidence that it has passed into his hands.

Chemical analysis.—The principal chemist assigns the work to his different assistants. None of them conduct special analyses, but work on any or all samples according to the number and varieties received. The principal chemist exercises general supervision and examines poisons and all specimens that may have a medico-legal significance.

Bacteriological diagnosis.—The principal bacteriologist assigns the work to the different assistants. The specimens and cultures are

assembled and properly distributed by a senior bacteriologist. The greatest amount of work is the examination of diphtheria cultures, and this is the first work executed in the morning. Five bacteriologists are assigned to it and finish the bulk of it by noon. Laboratory assistants prepare and stain the specimens and number the slides for proper identification, the bacteriologist recording the findings on the card under his initials.

One bacteriologist is assigned to make examinations of sputum. Widals and the making of cultures from urine and feces are performed by one of the senior bacteriologists. Examinations for rabies and those requiring special technique are made either by the director or the principal bacteriologist.

The culture media are prepared under the direction of a junior bacteriologist and in a room set aside for this purpose, and each laboratory assistant employed therein is assigned to a particular part of the work, so that if a shortage in certain media or outfits occurs proper responsibility can be fixed.

Milk.—A separate room is used exclusively for the analysis and examination of milk samples. A first and second chemical test of milk is made by different employees, and each initials his work. Both the chemical and bacteriological examinations are carried out in this room, the former by a chemist and laboratory assistant and the latter by two bacteriologists. The samples of milk, when received from the inspector, are immediately placed in the refrigerator, which is kept locked until the examination can be carried out. Reports on chemical milk tests are made on a special blank, and record specific gravity, butter fats, solids not fats, and total solids.

Another bacteriologist of the milk division is engaged in field work. He is an expert in pasteurization and follows up the plants in which the bacteriological counts of milk are high. He plates from samples taken at different stages and at the conclusion of the process, and in that way is able to detect faulty procedure and indicate proper remedial measures.

Water.—A separate room is equipped for the examination of water, and both the chemical and bacteriological work is done by a senior chemist, who is skilled in bacteriological technique. When the work is excessive he is assisted by a bacteriologist. An average of about 12 samples of water is examined daily. Examination is made of all samples for presence of colon bacillus.

Samples of water are taken from the cribs three times a week and from the pumping stations daily. Three employees are engaged in taking samples.

Outfits furnished.—Numerically the most important outfit furnished is that for diphtheria cultures. This consists of a wooden tongue depressor and cotton swab in a small sealed envelope, a metal box

or tube containing the blood serum media, and card for recording proper data concerning patient from whom the culture is made, all of which is inclosed in a thick manila envelope. The card contains instructions for the proper taking of the culture. These outfits are kept on hand at each of the 44 police stations in the city. They can also be received by direct application to the laboratory and from a certain number of drug stores. The cultures can be delivered direct to the laboratory or the medical inspection bureau at any time during the day or night, an employee always being on duty. They can also be delivered to any of the police stations, as electrically heated incubators are maintained at all stations for the proper care of such cultures. They are taken to the laboratory each morning and afternoon by the messenger service of the station. This service is performed by the police department in return for services rendered by the laboratory in making analyses of various specimens submitted by it. Since the adoption of incubators (1914) at the stations and the provision requiring the officer who receives the culture from the physician to initial the card, this system has proven, in the main, satisfactory.

The outfit for submitting blood for Widals consists of a card for recording the necessary data. To this is attached a piece of aluminum foil, on which the specimen of blood is placed. The card is inclosed in an envelope. These outfits are furnished on request.

Outfit for collection of bacteriological milk samples.—A simple and inexpensive outfit has been devised by the laboratory for the collection of milk samples. It consists of a pint tin with depressed cover in which a suitable number of holes are punched to hold the test tubes used in collecting samples; six tubes are carried. The can is used as an ice receptacle, and a rubber cloth, held in place with an ordinary rubber band, is placed over the top of the can to protect the cotton plugs of the tubes. A pipette case of metal, 12 inches long, with a tightly fitting cap 3 inches long, is used for carrying a requisite number of pipettes. A small awl for removing caps and an alcohol lamp of a flat type complete the outfit.

This outfit is simple, compact, easily carried in the inspector's sample case, and is well adapted for the purpose.

No special container for sputum is furnished, and slides are supplied only on application.

No cultural control of disinfection is practiced, but such a procedure seems advisable from time to time for the purpose of checking up the technique of the disinfector.

Time required for examinations.—The time necessary for the completion of an examination naturally depends upon the character of the analysis required. Examinations of major importance, such as

diphtheria, typhoid fever, and sputum, are given precedence and are usually completed in one day.

I submit below a tabulated statement, compiled from the records of the laboratory, giving the time required to examine different specimens and samples:

	Days.
Diphtheria	1
Typhoid fever (Widal)	1
Urine	1
Wassermann	[1] 1 to 5
Rabies	1 to 4
Sputum (tuberculosis)	1
Milk (chemical)	([2])
Milk (bacteriological)	2
Water (chemical and bacteriological)	[3] 2 to 7
Beer, whisky	2 to 26
Drugs (chemical)	1 to 20
Food supplies (chemical)	1 to 4
Soap (chemical)	1 to 6
Garbage, products	1 to 4

Antitoxins, toxins, and vaccines.—No products of this nature are made or issued by the laboratory. Antitoxins are supplied by the State board of health. Other products are secured by competitive bid and are distributed throughout the city at designated drug stores, and the health officers secure the requisite amount from the nearest station. A report is made on a blank to the secretary of the State board of health of each package of antitoxin used, giving name, address, and age of patient.

Vaccine is bought under competitive bid by the city department of health and kept on hand at the department and issued whenever required.

Reports of results.—Results of examination of diphtheria cultures, typhoid fever, and sputum specimens are immediately telephoned to those interested, and this verbal message is supplemented by report on post card; except in cases of diphtheria only positive cases are so verified.

Results of rabies tests are telephoned to interested parties if the examination proves positive. This is supplemented by letter, but in case of negative result report is made only by letter. A written report of all such examinations is immediately made to the bureau of medical inspection.

The system of reporting results of the important classes of examinations is satisfactory, since the information is furnished promptly to interested parties.

Records and files.—Each division has a counter record book into which the data on the card accompanying the specimen is copied,

[1] Average 3 days. [2] Same day. [3] Average 4 days.

and the results of each examination are entered under the initials of the examiner.

The cards made out for each sample or specimen are filed according to the class of analysis, and are satisfactory. Diphtheria cards, which form the greater part, are filed in the laboratory under the physician's name, and the report furnished the bureau of medical inspection is under the patient's address, thus constituting a cross-file in this particular class.

Supervision.—The director exercises general supervision of all the divisions and their work, and one of his duties is to see that this work is expeditiously performed and that proper reports are immediately sent. The principal bacteriologist and the principal chemist are directly responsible to the director for their respective divisions. They assign the work to their assistants and supervise it. The general supervision of the work in the laboratory seems to be satisfactory.

Special work.—Special bacteriological studies in relation to outbreaks of disease or for experimental purposes are conducted by the director. Such subjects are indicated by the commissioner of health when the necessity arises.

Statistical.

An examination of the recorded work of the laboratory shows a steady annual increase for the past five years.

The following table presents the data by years:

	1910	1911	1912	1913	1914
Total examinations and analyses	112,375	113,429	120,533	145,069	162,266
Bateriological	66,711	66,250	66,027	90,520	104,686
Chemical	45,664	47,179	54,506	54,540	57,572
Special investigations	.....	.....	.....	9	8

This increased amount of work has necessitated an increase of both technical and nontechnical employees in order to insure prompt and satisfactory examinations and analyses. At the present time one additional chemist, three laboratory assistants, and one clerk are necessary.

Table showing principal classes of examinations during 1914.

MEDICAL DIAGNOSIS.

Disease.	Total specimens.	Positive.	Negative.	Remarks.
Diphtheria	78,736	14,191	60,756	No growth, 1,955; contamination 1,779; streptococci, 92.
Widal tests	3,567	717	2,659	Atypical, 191.
Sputum for B. tuberculosis	6,558	1,796	4,762	
Rabies	231	122	94	Suspicious, 3; unsatisfactory, 12.
Urines	896	.....	.....	
Wasserman tests	771	.....	.....	
Pus for gonococci	276	.....	.....	
Urine and feces for typhoid	94	.....	.....	
Miscellaneous	409	.....	.....	

Miscellaneous chemical analyses.

Foods	1,070
Drugs and medicines	23
Taxicological	40
Urines	1,442
Department supplies	1,138
Supplies, other city departments	71
Police department	352
Other tests	228
Air, ventilation division	1,326
Total	5,690

Milk.

Chemical analyses	50,397
Bacteriological examinations	9,114
Total	59,511

Water.

Chemical analyses	1,485
Bacteriological examinations	4,034
Total	5,519

Research Division.

The question of establishing a research division in connection with the laboratory and under the director has been agitated and it was therefore necessary to study the advisability of creating such a division.

Several research laboratories already exist, operating under endowment, in connection with universities and under Federal aid; and the results in such laboratories in studying problems affecting the public health are published for the information of all. These laboratories are devoted to special studies that require a highly trained personnel and expensive equipment, which are beyond a small division in a board of health laboratory with an inadequate or limited appropriation.

It does not seem feasible under present conditions to create a research laboratory in connection with that of the Department of Health; however, it might be advisable to establish an experimental division in which studies of problems directly affecting the regular work of the department could be carried out.

[The third installment of this report will appear in a subsequent issue.]